LBNE LAr Parameters Spreadsheet

Version 10.6 - 11/4/2011

Changes highlighted in RED

33 kton

Input value

Calculated

Reference Design, 800'

Quality	Meaning
***	Stable, well understood parameter
**	Reasonably well defined parameter
*	Rough estimate

Parameter	Value	Units	Quality	Req ID	Notes
Anode Plane Assembly (APA)					
Cathode Plane Assembly (CPA)					
Detector Module					
Cryostat module					
Electronics					
High Voltage					
Cryogenics					
Detector Depth					
Radioactive Background					
Veto System					
Veto Configuration					
Veto Counter					
Photon Detector					
Num paddles per APA	10		**		
Num PMT's per paddle	10				
Paddle acrylic thickness	0.48	cm	*		
Paddle acrylic width	9	cm	*		
Paddle acrylic length	200	cm	*		
Total num PMT's for 2 cryostats	2160				
Sensitivity at 3.7 m	0.1	PE/MeV	*		For a MIP
Maximum N2 contamination	1.9	ppm	*		2 ppm nitrogen contamination will start interfering with 3 m to 4 m photon transmission in LAr
DAQ					
DAQ readout mode	Continuous		***		Needed for pdk, SN
DAQ hit rate					
DAQ samples/hit					
Data rate: beam events					
Data rate: non-beam events					
Data compression factor					
Cavern & Pit					
Highbay length	139.2	m			Allow 20m for cryo equipment and loading dock. 2 cryostats end to end.
Highbay width	32.1	m			3 m aisleway on both sides
Highbay height	6	m	*		Excluding TPC loading zone
Highbay volume	26851	m^3			
Primary access	Drive-in		**		
Secondary access	existing drifts		***		
Concrete pit thickness	0.5	m	***		
Pit Width	26.1	m			Inside dimension to finished concrete
Pit Depth	18.0	m			Inside dimension to finished concrete
Pit Length per cryostat	50.6	m			from finished concrete wall at each end
Septum pit clear width	15.0	m	*		space for purification system
Setpum wall thickness	1.5	m	**		calculated to withstand hydrostatic pressure
Septum total width	18.0	m			
Pit length for two cryostats	119.2	m			from finished concrete wall at each end
Pit Volume per cryostat	23791	m^3			
Pit Surface Area per cryostat	5407	m^2			
Maximum angle of incline/decline for drive-in access	12	degrees	***		
Maximum angle of incline/decline for drifts other than drive-in access	15	degrees	***		
Pit floor tolerance to horizontal plane	0.1	m	**		Maintain LAr cover over detector & proper ullage.
Pit concrete flatness requirement	+/- 12	mm	**		General tolerances from GTT
Pit length, width, depth, tolerance	+/- 30	mm	**		General tolerances from GTT
Highbay maximum temperature	82	F	**		Upper range for electronics
Highbay minimum temperature	50	F	**		Lower limit for electronics
Highbay maximum dewpoint	48	F	**		To prevent condensation if electronics is cooled.
Highbay maximum relative humidity	85	%	**		
Highbay minimum relative humidity	15	%	**		